

SIX MILE AND PHEASANT BRANCH CREEKS AND LAKE MENDOTA WATERSHED (LR10)



Construction site erosion

This 85-square mile watershed was one of the first Nonpoint Source Pollution Priority Watershed Projects undertaken by WDNR and has once again been chosen as a project in the Lake Mendota Priority Watershed Project. Despite work over the past 10 years to reduce polluted runoff problems in the Lake Mendota watershed(s), sources of polluted runoff continue to be the largest threat to this lake. Simultaneously, Lake Mendota is a contributor to nutrient loading in the downstream Yahara chain-of-lakes.

The focus of the current priority watershed project is to continue implementing controls on polluted runoff, restoration and protection of wetlands, and including urban sources of nutrients and sediment as well as agricultural sources. In 1995, a Lake Mendota Watershed Urban Working Group was formed comprised of professionals in state, county and local governments with a "stake" in the watersheds (i.e., the towns, villages, cities and unincorporated areas within LR09 and LR10). This urban work group has made progress on stormwater modeling and construction site erosion control implementation in the past year, starting with the upgrade of Dane County's Erosion Control Ordinance. A number of stormwater and erosion control projects are underway in individual municipalities, as well.

This watershed has a medium susceptibility for groundwater contamination based on WDNR groundwater susceptibility mapping.

Table 1. Municipalities in the Yahara R./Lake Mendota Watershed

Municipality	W/S#	County	1995 Population	2000 Population	Percent Growth 1995 - 2000
C. Madison	LR8 LR09 LR10	Dane	199,518	208,054	4.3
T. Madison	LR10	Dane	6,627	7,005	5.7
C. Middleton	LR10	Dane	14,818	15,770	6.4
T. Middleton	LR10	Dane	3,968	4,594	15.8
V. Waunakee	LR10	Dane	7,219	8,995	24.6
V. Dane	LR10	Dane	698	799	14.5



Pheasant Branch Creek: steep, sparsely vegetated slope



Wastewater spray runoff in Sixmile Creek

Sixmile Creek Water quality in Six Mile Creek's 12-mile length is generally good, supporting a limited forage fishery west of Hwy 113, a diverse forage and warm water sport fishery from Hwy 113 to Lake Mendota, and abundant spawning areas. Six Mile Creek's 43-square-mile watershed is predominately agricultural (63%) but also includes

the rapidly urbanizing village of Waunakee (WDNR 1996b). From 1995 to 2000, the village grew by 25%, to roughly 9,000 people. Waunakee's wastewater effluent is treated at the Madison Metropolitan Sewerage District (MMSD). Upstream of the village, Waunakee Marsh traps sediment from the area's row-cropped fields, which is adversely affecting the wetland's ecology.



White sucker

Downstream of the village of Waunakee to Lake Mendota urban development threatens the stream. Several small rural communities and large developments lie in the drainage area outside of the village, contributing pollutants from agricultural land spreading, construction site erosion, and habitat loss. In Summer 1991, Stokely's wastewater spray irrigation system--which landspreads its canning waste on 178 acres just outside of the village--malfunctioned, causing fish kills in Six Mile Creek. This incident was not the first caused by Stokely's landspreading operations. Fish kills in Six Mile Creek occurred three times in a short two-year period. The July 12, 1991 spill released 6,000 gallons of untreated wastewater directly into the creek. This spill followed on the heels of a pipe leak July 1, 1991, during which 85,000 gallons of wastewater drained into the creek. In 1990 a spill released to the creek 230,000 gallons from a pipe leak (WDNR 1996a). Fish managers estimate hundreds to thousands of pike, walleye, bass etc., fingerlings were killed in the last incident, as a fish rearing marsh for Lake Mendota is located just off the creek.



Creek chub

A recent fishkill on Six Mile Creek on July 2, 2001, resulted in the death of over 200 fish (white suckers and creek chubs) near Madison Street Bridge in Waunakee. The fishkill coincided with the flushing of a new water main. New water mains are typically more heavily chlorinated as a means to sanitize and disinfect before bringing the main online. It's likely that this flushing event depressed oxygen levels or contained high levels of chlorine, resulting in a fishkill.



Pheasant Branch Creek and marsh

Pheasant Branch Creek is 7-mile-long stream that drains 22.7 square miles of west-central Dane County. It enters Lake Mendota from the west. The stream's South Fork is intermittent and flows north from its headwater near Mineral Point Road. It drains the rapidly urbanizing west side of Madison and the city of Middleton. The North Fork drainage area is predominately agricultural until its confluence with the South Fork at the western edge of the city of Middleton and Highway 12. Much of the North Fork has been channelized and straightened in the segment west of the city of Middleton. The stream is still rapidly eroding a channel through the terminal moraine that once blocked its outlet to Mendota. Cultivation of land draining to the creek, ditching, straightening, and urbanization have all increased the peak flows through the downstream section, accelerating channel and bank erosion (WDNR 1981). In addition, much of the historic wetland along the creek has been drained.

Downstream of the confluence of the North and South forks, the stream passes through the city of Middleton and has a fairly steep gradient until it enters Pheasant Branch Marsh just upstream of its mouth. Despite extensive rip-rapping before 1991 to reduce severe channel erosion in the city of Middleton, streambank erosion continued. Given the extensive and rapid urbanization of both the North and South Fork areas, channel erosion will likely remain a problem.

Increased urbanization delivers increasing amounts of sediment to Pheasant Branch Marsh and Lake Mendota, requiring occasional dredging of the mouth of the stream.



*Pheasant Branch Creek:
North Fork*

Stormwater management structures already installed in the Madison portion of the South Fork drainage area may not be adequate to handle future growth. The rapidity of urban development, particularly west of the Beltline Highway, exceeds the ability of the channel and these structures to adequately handle the runoff and sediment loads. For example, sediment-laden stormwater from a spring 1989 storm flowed out of the channel, flooding a jogging path and bypassing two wet detention basins. After the same storm, Pheasant Branch Creek at the Highway 12 bridge carried a heavy sediment load from agricultural erosion in the North Fork drainage area, construction site erosion from the South Fork drainage area, and construction site erosion from highway construction in Middleton. As this area continues to develop, peak flows will increase, causing more channel and streambank erosion.



*Pheasant Branch Creek:
South Fork dried
streambed*

In 1995, the city of Middleton began a channel manipulation project on Pheasant Branch Creek to relocate the South Fork of the creek from the city limits to the confluence with the North Fork. This work includes construction of a detention pond. The project's goals are to reduce the 100-year floodplain and improve flood control through constructing detention ponds. The detention pond is a 22-acre sedimentation basin that includes a filtering system to reduce sediment influx into the pond during the first flush of a storm. The system is designed with gabions that run perpendicular to the flow to prevent streambank erosion and a filtering system to trap nutrients, sediment and heavy metals before they enter the pond and are washed downstream to the river. Overall, planners hope the project will reduce streambank erosion, in-stream sedimentation, and peak flows following heavy storms. While this project has positive aspects, the stormwater control dam will likely increase water temperatures in the downstream reach and prevent fish migration (WDNR 1996b).

In 1994, Dane County purchased more than 160 acres to add to the existing Pheasant Branch Creek Resource Protection Area, including springs that feed the creek, one of which produces over 900 gallons per minute (WDNR 1996b). WDNR fish managers are managing 60 of those acres to protect and enhance northern pike habitat; northern pike from Lake Mendota use this wetland area for spawning.

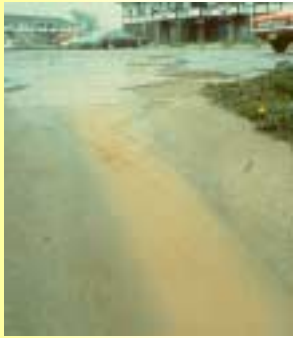
The Pheasant Branch fishery consists of tolerant forage fish above the Pheasant Branch Marsh (Hwy 12). From the marsh to Lake Mendota, a diverse warm water fishery exists. Northern pike have used the marsh as a spawning site but sediment carried by the stream is impairing this fishery use (WDNR 1996b).

Spring (Dorn) Creek Six-mile-long Dorn Creek originates in the town of Springfield (T8N, R8E, S13) and flows southeast through agricultural lands and Governor Nelson State Park before meeting Six Mile Creek. The stream drains 12.7 square miles that are 78 percent agricultural and 16 percent wetland. Wetlands adjacent to the creek provide wildlife habitat and spawning for northern pike. The creek supports a mainly tolerant warm water forage fishery. Two intolerant species are also known to inhabit the creek--the Northern Redbelly Dace and Pearl Dace (WDNR 1996b).



*Pearl dace (top) and
Redbelly dace (bottom)*

Willow Creek is the local name for a stormwater ditch that empties into Lake Mendota at University Bay. The ditch serves a large portion of the near west side of Madison, much of Shorewood Hills, and a part of the University of Wisconsin west campus, particularly the School of Agriculture. The drainage basin of the ditch contributes the normal pollutants carried in such ditches such as toxic elements from parking lots and



Parking lot runoff

streets and nutrients from lawns. Sediments carried to Lake Mendota by the ditch are thought to be silting in a portion of University Bay at the mouth of Willow Creek. In the past, the ditch had a history of receiving stormwater runoff from animal holding pens on the School of Agriculture portion of campus. For example, runoff containing animal waste entered the ditch during the winter of 1989-1990. Since that time, the University has taken substantial measures to improve the situation by connecting the animal holding pens to the sanitary sewer and performing daily cleanup of manure. The University was given permission to discharge waste from three animal holding pens located near the Stock Pavilion on the UW-Madison campus into the Madison Metropolitan Sewerage District collection system. The university currently discharges waste from at least one of these pens into the collection system and may be discharging waste from the remaining pens (MMSD).

LAKES



Tiedeman's Pond

Lakes in this watershed are small, glacial pothole lakes or ponds. Four of them, **Tiedeman's, Stricker's, Esser's and Graber Ponds**, are in the rapidly developing areas of Madison and Middleton. Water quality in each pond is affected by polluted runoff. Nitrogen, phosphorus, and chloride concentrations were elevated from Tiedeman's, Stricker's and Esser's ponds in 1982. Fish contaminant sampling on Graber Pond in 1990 indicated no concentrations above detection.

A 1982 U.S. Geological Survey study of the potential impacts of urban development on water levels in Tiedeman's, Stricker's, and Esser ponds showed peak water stage will increase over what it otherwise would have been without development. The three ponds experience nuisance growths of algae and aquatic vegetation during summer, which is typical of small ponds and impoundments in southern Wisconsin. All the ponds except Graber's freeze over during winter. A small portion of Graber's is open during winter due to an industrial non-contact cooling water discharge to the pond.

Brandenburg Lake also known as Lake Katrine, is a 38-acre seepage lake with a mean depth of 6 ft and a maximum of 9 ft. The surrounding subwatershed is comprised of 60% agricultural lands, 14% grassland, 8% wetland and 4% residential. In the early 1980s, the lake was used for walleye rearing, but agricultural pesticides resulted in poor survival and that lake use was discontinued.



Goldenrods amongst sedges

Resources of Concern (LR10)

WDNR's Heritage Resources Database indicates that the following water-dependent endangered, threatened or special concern species and/or communities have been sighted in this watershed within the last 20 years.

Table 2. Endangered, Threatened or Plant Communities of Special Concern

Plant Community	Location	Indicator Species/Description
Emergent Aquatic, Southern Sedge Meadow,	Pheasant Branch Creek	Less than 100 acres of this large wetland remains in a relatively undisturbed state. Vegetation is mostly a mixture of sedge and emergent marsh plants, with only 6 acres of open water present.



Blacknose dace

Plant Community	Location	Indicator Species/Description
Shrub-Carr, Springs and Spring Runs	Pheasant Branch Creek	Among the fish species in the stream are blacknose and southern redbelly daces, creek chub, fathead minnow and bowfin. Most of the tract is owned by the city of Middleton, but extensive residential and commercial developments adjoin the site.
Southern Dry-Mesic Forest	Owen Woods	Owen Woods is a city of Madison conservation park on the city's west side; the site contains a dry mesic oak woods situated on undulating morainal deposits. Dominant canopy trees including white, black, red and burr oaks, black cherry, white ash and sugar maple.
Southern Dry-Mesic Forest	Second Point Woods	A small stand of even-aged red oaks used by the University of Wisconsin for demonstration purposes.



Creek chub

RECOMMENDATIONS

Recommendations for Lake Mendota will be found under the Yahara-Mendota watershed above. The Dane County Regional Planning Commission has developed a set of specific recommendations for polluted runoff abatement in Dane County communities. This list should also be considered by the communities when planning their water quality work and budget items.



Fathead minnow

1. The University of Wisconsin should maintain responsible manure management on its campus and farms in the watershed.²
2. The Lower Rock River Basin Team, with the assistance of the city of Madison, the village of Shorewood Hills, and the University of Wisconsin, should undertake sediment monitoring in Lake Mendota at the mouth of Willow Creek to determine if any toxic substances enter the lake via this stormwater channel.¹
3. The city of Middleton or a private group should do Self-Help monitoring on Stricker's, Tiedeman's and Graber ponds as a first step toward addressing water quality problems due to urbanization.²
4. The Lower Rock River Basin Team, Madison, Middleton, and Dane County should develop a comprehensive watershed stormwater management plan for the Pheasant Branch drainage area.^{1,2}
5. Madison, Middleton and Dane County should improve enforcement of their construction site erosion control ordinances.²
6. Madison, Shorewood Hills and the University of Wisconsin should work together to address the stormwater management concerns and problems in the Willow Creek drainage area.²





Black oak

7. The village of Waunakee and Dane County should vigorously enforce erosion control ordinances to protect the water quality of Six Mile Creek, particularly in the reach from and including Waunakee Marsh to Governor Nelson State Park. ²
8. The Lower Rock River Basin Team, city of Middleton and Dane County should develop a comprehensive plan to protect the Frederick Springs and Pheasant Branch Marsh. This effort should address stormwater flows and identify, and recommend means to protect, groundwater recharge areas which feed the springs. ^{1, 2}

1. These recommendations are a basis for work planning or other decisions, which must be approved by the appropriate DNR division administrator (the recommendations are a starting point for the work planning process).

2. These recommendations are advisory to the public, local governments, lake management organizations, and other groups or agencies. These recommendations are not binding. No statutory or codified requirements exist

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Red oak leaf and tree

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Table 3. Streams in the Six Mile And Pheasant Branch Creeks Watershed (LR10)

Stream Name	WBIC	County	Length (Miles)	Existing Use (Miles)	Potential Use (Miles)	Supporting Potential Use (Miles)	Current Codified Use	303(d) Status	Use Impairment		Data Assessment	Data Level	Trend	References
									Source	Impact				
Pheasant Branch	0805900	Dane	0 - 1	WWSF/1	Same	Part - Thr	WWSF*	N	HM, CL, SB, BY, DEV, CE, URB, BY	DO, FLOW, HAB, TURB, SED, MIG, NUT	M	B4 H1 C1	D	10, 12, 17, 22, 23, 25, 56, 73, 83, 85
			1 - 10	LFF/9	Same	Part	WWSF*	N	HM, CL, SB, BY, DEV, CE, URB	DO, FLOW, HAB, TURB, SED, MIG, NUT	M	B3 H2 C3	D	
Six Mile Creek	0805500	Dane	0 - 8.5	WWSF/8.5	Same	Part - Thr	ERW	N	HM, DEV, CE, URB, PSI, CL, PSI, BY	BAC, HAB, TURB, SED, DO, MIG	M	B4 H4 C3	S	10, 12, 17, 21, 23, 56, 73, 77, 83, 85
			8.5 - 12	LFF/3.5	Same	Part - Thr	WWSF*	N	HM, DEV, CE, URB, PSI, CL					
Spring(Dorn) Creek	0805600	Dane	0 - 1	WWSF/1	Same	Part	WWSF*	N	HM, CL, BY, SB, CE, URB, DEV	BAC, HAB, TURB, SED, FLOW, DO, MIG	M	B2 H2 C2	D	10, 12, 17, 21, 23, 56, 63, 73, 83, 85
			1 - 6	LFF/5	Same	Part	WWSF*							
2 Unnamed Streams			2											

Table 4. Lakes of the Six Mile and Pheasant Branch Creeks Watershed (LR10)

Lake Name	County	Town, Range, Section	WBIC	Surface Area (Acres)	Max Depth (ft)	Mean Depth (ft)	Lake Type	Winter kill	Access	SH	Hg	Mac	LMO	TSI	TSI Class	Lake Plan Prot	P Sens	Impairment		Comments
																		Source	Impact	
Barbian Pond	Dane	T08NR08E S02	0774100	11	--	--	DG	--	--	--	GA	--	--	--	--	--	--	--	--	--
Brandenberg Lake	Dane	T08NR08E S06	0774700	38	6	--	SE	Y	BR	--	GA	--	--	--	--	PROT	II B	CL	NUT, DO, MAC, ALG	--
Dahmen Pond	Dane	T08NR08E S16	0775300	17	4	--	--	--	--	--	GA	--	X	--	--	--	II Ins	--	--	--
Diedrich Pond	Dane	T08NR08E S04	0775400	19	6	--	DG	--	--	--	GA	--	X	--	--	--	II Ins	--	--	--
Esser Pond	Dane	T07NR08E S15	783730	15	--	--	SE	--	--	--	GA	--	--	--	--	--	--	NPS, URB	HAB, NUT, TURB, ALG	--
Graber-Deher Pond	Dane	T07NR08E S02	0873950	13	4	--	SE	Y	--	--	GA	--	--	--	--	--	--	CE, NPS, URB	HAB, NUT, TEMP	--
Indian Lake	Dane	T08NR07E S02	1249000	66	6	5	SE	Y	T	--	GA	--	--	60*	EU	PROT	II Ins	--	--	Indian Lake Co. Park on S side
Kalscheur Pond	Dane	T08NR08E S08	0777100	11	--	--	--	--	--	--	GA	--	--	--	--	--	--	--	--	--
L. Buechner Pond	Dane	T08NR08E S08	0778000	9	8	--	--	--	--	--	GA	--	--	--	--	--	I Ins	--	--	--
Little Lake Mendota	Dane	T09NR10E S07	--	20	--	--	DG	Y	--	--	GA	--	--	--	--	--	--	--	--	chain of ponds NW of De Forest; junction of CV & V
Springfield Pond	Dane	T08NR08E S05	0780200	--	--	--	--	--	--	--	GA	--	--	--	--	--	--	--	--	--
Stricker Pond	Dane	T07NR08E S14	783750	15	4	--	SE	--	--	--	GA	--	--	--	--	--	--	CE, URB	HAB, MAC, TURB	--
Tenney Park Laqoon	Dane	T07NR09E S12	0780650	--	--	--	--	--	--	--	GA	--	--	--	--	--	--	--	--	--
Tiedeman's Pond	Dane	T07NR08E S14	783740	15	6	--	SE	--	--	--	GA	--	--	--	--	--	--	URB	HAB, MAC, TURB	--
Waunakee Marsh	Dane	T08NR08E S11	0805700	--	--	--	--	--	--	--	GA	--	--	--	--	--	--	--	--	--

